WQB "Wide Aperture Quad" for Main Injector

6 October 2005, 9:00 AM
Club 157

Attendees: Linda Alsip, Bruce Brown, Weiren Chou, TJ Gardner, Hank Glass, Dave Harding, Bill Robotham

Measurements

Hank showed thermal measurements on the trim coil. The temperature difference between the trim coil and the main coil was about 7ºC with the trim running DC at 42 A, well beyond the specification.

Hank also showed end field data at 1000 A and 3600 A. There doesn't appear to be anything outrageous going on at the end.

Measurements will continue on WQB001

1. Harmonics as a function of transverse position with the shorter Main Ring quad Morgan coil to extract higher order harmonics, taking data at ¼" steps between -1" and +1".
2. Hysteresis measurements using the same ramps as were used in the studies of IQB/IQC/IQD magnets to set the reset points in use now.
3. Stretched wire scan at 200, 1000, 2800, and 3600 A to confirm the adequacy of the field shape.
4. Additional trim coil strength measurements.

Vladimir had earlier circulated by e-mail a note describing his calculations of the inductance of the trim coil. While there was not perfect agreement with the measurements, the ratio of trim coil inductance to main coil inductance is the same in calculation and measurement. The difference from the naïve N^2 dependence is explained by the geometry and where the flux lines go.

Design issues

Main Injector Department discussed the core length options and decided that they want the length on all magnets as it is on WQB001. They do not want to lengthen the magnet to decrease the maximum trim coil current because that would increase the disagreement at 120 GeV (~2800 A). While they would like to reduce the length to decrease the correction needed at 120 GeV, that would increase the maximum correction required at the high end (150 GeV, ~3600 A) beyond the comfort level for the power supplies.

There was no excitement about the trim coil polarity convention. The magnets will be labeled with instruction on how to power them to achieve the desired results.

Fabrication

WQB001 is at still MTF.

WQB002 has been retrofitted with the water-cooled bus and is ready for MTF.

WQB003 has been manifolded with the water-cooled bus and is ready for MTF.

WQB004 has its manifolding dry fit and is ready for brazing.

WQB005 is being assembled in the rollover fixture.

WQB006 has two cores stacked, two coils ready to pot, all main and trim coils are wound and wrapped.

WQB007 has all its main coils wound.

Linda V sent word that all the BPM's have been received.

Schedule

The current schedule shows completion of seven magnets by 12 December 2005 and nine magnets by the end of January 2006.

Next meeting will be 20 October 2005 at 9:00 in the Industrial Building 2 conference room.